

CLAIMS

WE CLAIM:

1. For a CANOpen network including a bus master and an I/O module, each
5 communicatively coupled to a common bus, wherein the I/O module is subject to a state
change, a method of permitting the bus master to collect state information from the I/O
module, the method comprising:

sending a state signal from the I/O module to the bus master in response to
a state change of the I/O module;

10 sending a trigger signal from the bus master to the I/O module; and
sending a state signal from the I/O module to the bus master in response to
the trigger signal.

2. The method of claim 1 including a plurality of I/O modules, each
15 communicatively coupled to the common bus, wherein each of the I/O modules is subject
to a state change, the method comprising:

sending a state signal from each of the I/O modules to the bus master in
response to a state change of the particular I/O module;

sending a trigger signal from the bus master to a selected one of the I/O
modules; and

20 sending a state signal from the selected I/O module to the bus master in
response to the trigger signal.

3. The method of claim 2 comprising:

configuring a plurality of the I/O modules as a group;

25 sending a state signal from each of the I/O modules to the bus master in
response to a state change of the particular I/O module;

sending a trigger signal from the bus master to a selected group of the I/O
modules; and

sending a state signal from each I/O module of the selected group of I/O
modules to the bus master in response to the trigger signal.

30 4. The method of claim 3 wherein the group of I/O modules is less than the
total plurality of I/O modules.

5. For a CANOpen network including a bus master and a plurality of I/O modules, each communicatively coupled to a common bus, wherein the plurality of I/O modules are configured as a plurality of groups of I/O modules, and each of the I/O modules is subject to a state change, a method of permitting the bus master to collect state information from a selected group of I/O modules, the method comprising:

5 sending a state signal from each of the I/O modules to the bus master in response to a state change of the particular I/O module;

10 sending a trigger signal from the bus master to the selected group of I/O modules; and

15 sending a state signal from each of the I/O modules in the selected group to the bus master in response to the trigger signal.

6. A CANOpen network comprising:

a bus master;

an I/O module subject to state changes;

20 a common bus communicatively coupling the bus master and the I/O module, wherein the bus master includes means for sending a trigger signal from the bus master to the I/O module, and the I/O module includes means for sending a state signal to the bus master in response to a state change and means for sending a state signal from the I/O module to the bus master in response to the trigger signal to permit the bus master to collect state information from the I/O module.

25 7. The network of claim 6 including a plurality of I/O modules, each communicatively coupled to the common bus, wherein each of the I/O modules is subject to a state change, wherein the bus master includes means for sending a trigger to a selected one of the I/O modules, and the I/O modules include includes means for sending a state signal to the bus master in response to a state change and means for sending a state
30 signal from the selected I/O module to the bus master in response to the trigger signal.

8. The network of claim 7, wherein:

each of the I/O modules includes means for sending a state signal to the bus master in response to a state change;

5 a plurality of the I/O modules are configured as a group;

the bus master includes means for sending a trigger signal from the bus master to a selected group of the I/O modules; and

each of the I/O modules in the selected group includes means for sending a state signal from each I/O module of the selected group to the bus master in response to the trigger signal.

9. The network of claim 8 wherein the group of I/O modules is less than the total plurality of I/O modules.

10. A CANOpen network comprising:

a bus master;

a plurality of I/O modules subject to state changes, wherein the plurality of I/O modules are configured as a plurality of groups of I/O modules and the plurality of I/O modules include means for sending a state signal to the bus master in response to a state change, and

a bus communicatively coupling the bus master and each of the I/O modules, wherein the bus master includes means for sending a trigger signal from the bus master to a selected group of I/O modules; and the each of the I/O modules in the selected group includes means for sending a state signal from each of the I/O modules in the selected group to the bus master in response to the trigger signal.

11. For a CANOpen network including a bus master and an I/O module, each communicatively coupled to a common bus, wherein the I/O module is subject to a state change, a method of permitting the bus master to collect state information from the I/O module, the method comprising: sending a state signal from the I/O module to the bus master in response to a state change of the I/O module;

determining if the bus master is prepared to receive further data from the bus;

35 sending a trigger signal from the bus master to the I/O module if the bus master is prepared to receive further data from the bus; and

sending a state signal from the I/O module to the bus master in response to the trigger signal.

12. The method of claim 11 including a plurality of I/O modules, each
5 communicatively coupled to the common bus, wherein each of the I/O modules is subject to a state change, the method comprising:

sending a state signal from each of the I/O modules to the bus master in response to a state change of the particular I/O module;

10 determining if the bus master is prepared to receive further data from the bus;

sending a trigger signal from the bus master to a selected one of the I/O modules if the bus master is prepared to receive further data from the bus; and

15 sending a state signal from the selected I/O module to the bus master in response to the trigger signal.

13. The method of claim 12 comprising:

configuring a plurality of the I/O modules as a group;

20 sending a state signal from each of the I/O modules to the bus master in response to a state change of the particular I/O module;

determining if the bus master is prepared to receive further data from the bus;

25 sending a trigger signal from the bus master to a selected group of the I/O modules if the bus master is prepared to receive further data from the bus; and

sending a state signal from each I/O module of the selected group of I/O modules to the bus master in response to the trigger signal.

14. The method of claim 13 wherein the group of I/O modules is less than the total plurality of I/O modules.

30 15. For a CANOpen network including a bus master and a plurality of I/O modules, each communicatively coupled to a common bus, wherein the plurality of I/O modules are configured as a plurality of groups of I/O modules, and each of the I/O modules is subject to a state change, a method of permitting the bus master to collect state information from a selected group of I/O modules, the method comprising:

35 sending a state signal from each of the I/O modules to the bus master in response to a state change of the particular I/O module;

determining if the bus master is prepared to receive further data from the bus;

sending a trigger signal from the bus master to the selected group of I/O modules if the bus master is prepared to receive further data from the bus; and

5 sending a state signal from each of the I/O modules in the selected group to the bus master in response to the trigger signal.

16. A CANOpen network comprising:

a bus master;

10 an I/O module subject to state changes;

a common bus communicatively coupling the bus master and the I/O module, wherein the bus master includes means for sending a trigger signal from the bus master to the I/O module when the bus master is prepared to receive further data from the bus, and the I/O module includes means for sending a state signal to the bus master in response to a state change and means for sending a state signal from the I/O module to the bus master in response to the trigger signal to permit the bus master to collect state information from the I/O module.

17. The network of claim 6 including a plurality of I/O modules, each communicatively coupled to the common bus, wherein each of the I/O modules is subject to a state change, wherein the bus master includes means for sending a trigger to a selected one of the I/O modules when the bus master is prepared to receive further data from the bus, and the I/O modules include means for sending a state signal to the bus master in response to a state change and means for sending a state signal from the selected I/O module to the bus master in response to the trigger signal.

18. The network of claim 17, wherein:

each of the I/O modules includes means for sending a state signal to the bus master in response to a state change;

30 a plurality of the I/O modules are configured as a group;

the bus master includes means for sending a trigger signal from the bus master to a selected group of the I/O modules when the bus master is prepared to receive further data from the bus; and

each of the I/O modules in the selected group includes means for sending a state signal from each I/O module of the selected group to the bus master in response to the trigger signal.

19. The network of claim 18 wherein the group of I/O modules is less than the total plurality of I/O modules.

5 20. A CANOpen network comprising:
a bus master;
a plurality of I/O modules subject to state changes, wherein the plurality of I/O modules are configured as a plurality of groups of I/O modules and the plurality of I/O modules include means for sending a state signal to the bus master in response to a state change; and

10 a bus communicatively coupling the bus master and each of the I/O modules, wherein the bus master includes means for sending a trigger signal from the bus master to a selected group of I/O modules when the bus master is prepared to receive further data from the bus; and the each of the I/O modules in the selected group includes means for sending a state signal from each of the I/O modules in the selected group to the bus master in response to the trigger signal.

20 21. For a CANOpen network including a bus master and an I/O module, each communicatively coupled to a common bus, wherein the I/O module is subject to a state change, a computer readable medium containing program instructions for execution by the bus master to cause the bus master to perform steps for collecting state information from the I/O module, the method comprising:

 sending a state signal from the I/O module to the bus master in response to a state change of the I/O module;

25 sending a trigger signal from the bus master to the I/O module; and
collecting a state signal from the I/O module sent by the I/O module in response to the trigger signal.

30 22. For a CANOpen network including a bus master and a plurality of I/O modules, each communicatively coupled to a common bus, wherein the plurality of I/O modules are configured as a plurality of groups of I/O modules, and each of the I/O modules is subject to a state change, a computer readable medium containing program instructions for execution by the bus master to cause the bus master to perform steps for collecting state information from a selected group of I/O modules, the method comprising:

35 sending a state signal from each of the I/O modules to the bus master in response to a state change of the particular I/O module;

sending a trigger signal from the bus master to the selected group of I/O modules; and
collecting a state signal from each of the I/O modules in the selected group sent
by the I/O modules in the selected group in response to the trigger signal.

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